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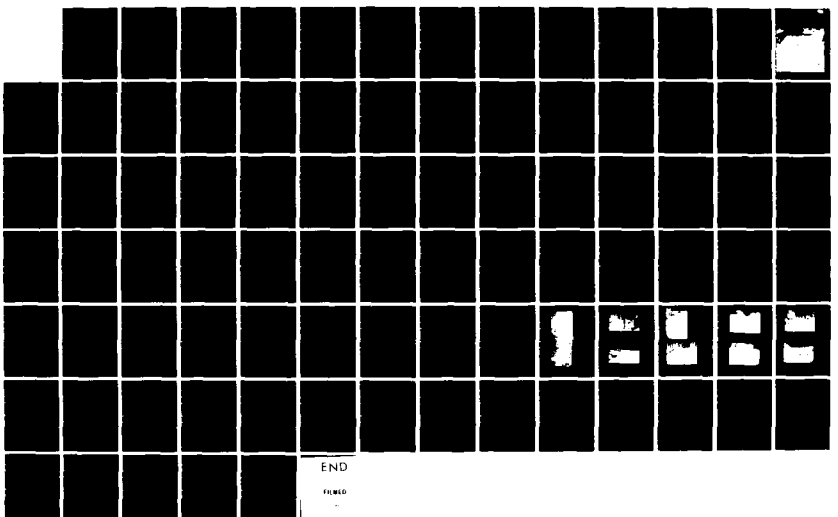

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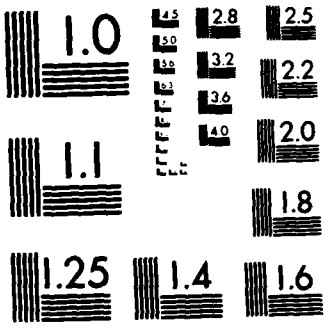

CONNECTICUT RIVER BASIN

SOUTHWICK, MASSACHUSETTS

CONGAMOND LAKES OUTLET
(MIDDLE POND)
MA 00071

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

MARCH 1979

UNCLASSIFIED

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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Southwick, Massachusetts

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This dam is comprised of two earth embankments with a central twin 8 foot wide concrete box culvert with concrete training walls. The inspection indicated the dam to be in generally good condition. The dam has a size classification of intermediate and a hazard classification of low. The test flood would be one-half the PMF.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF

NEDED

MAY 2 1979

Honorable Edward J. King
Governor of the Commonwealth of
Massachusetts
State House
Boston, Massachusetts 02133

Dear Governor King:

I am forwarding to you a copy of the Congamond Lakes Outlet Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Quality Engineering, the cooperating agency for the Commonwealth of Massachusetts. In addition, a copy of the report has also been furnished the owner, Town of Southwick, Southwick, Massachusetts 01077.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Quality Engineering for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

BRIEF ASSESSMENT

Identification No.: MA 00071

Name of Dam: Congamond Lakes Outlet (Middle Pond)

Town: Southwick

County and State: Hampden County, Massachusetts

Stream: Great Brook

Date of Inspection: December 5, 1978

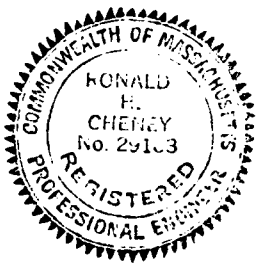
This dam is comprised of two earth embankments with a central twin eight foot wide concrete box culvert with concrete training walls. The box culvert contains two sets of grooved slots on the upstream face allowing for installation of stop logs. A two lane paved roadway travels over the crest of the structure and embankments. The existing culvert was built in 1955 to replace an earlier bridge structure which was washed out that year. The dam is owned, operated and maintained by the Board of Selectmen of the Town of Southwick, Massachusetts.

The inspection indicated the dam to be in generally good condition.

The dam has a size classification of intermediate and a hazard classification of low. According to Corps Guidelines the test flood would be one half the Probable Maximum Flood. The ½ PMF outflow, at the road culvert would be 385 cfs, with only the culvert outlet and 3 feet of stop logs considered,

the culvert can carry 78 percent of this outflow. Dam failure analysis using Corps guidelines indicates no serious damage or loss of life should occur due to failure. Downstream flooding due to the test flood is indicated. Indepth engineering data was not available and the dam was assessed primarily on the visual inspection, past performance history and hydrologic and hydraulic assumptions.

The dam is in generally good condition. However, it is felt that as part of the normal operation and maintenance procedures, that the brush and trees on the upstream and downstream slopes of the embankments be removed. This remedial measure is not of an immediate threat to the safety of the dam and it should be implemented by the owner within two years after receipt of this Phase I Inspection Report.



Ronald H. Cheney, P.E.
Associate

Hayden, Harding & Buchanan, Inc.
Boston, Massachusetts

This Phase I Inspection Report on Congamond Lakes Outlet (Middle Pond) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Joseph W. Finegan

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

Joseph A. McElroy

JOSEPH A. MCELROY, MEMBER
Foundation & Materials Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, CHAIRMAN
Chief, Structural Section
Design Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Inspections. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation: however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends or numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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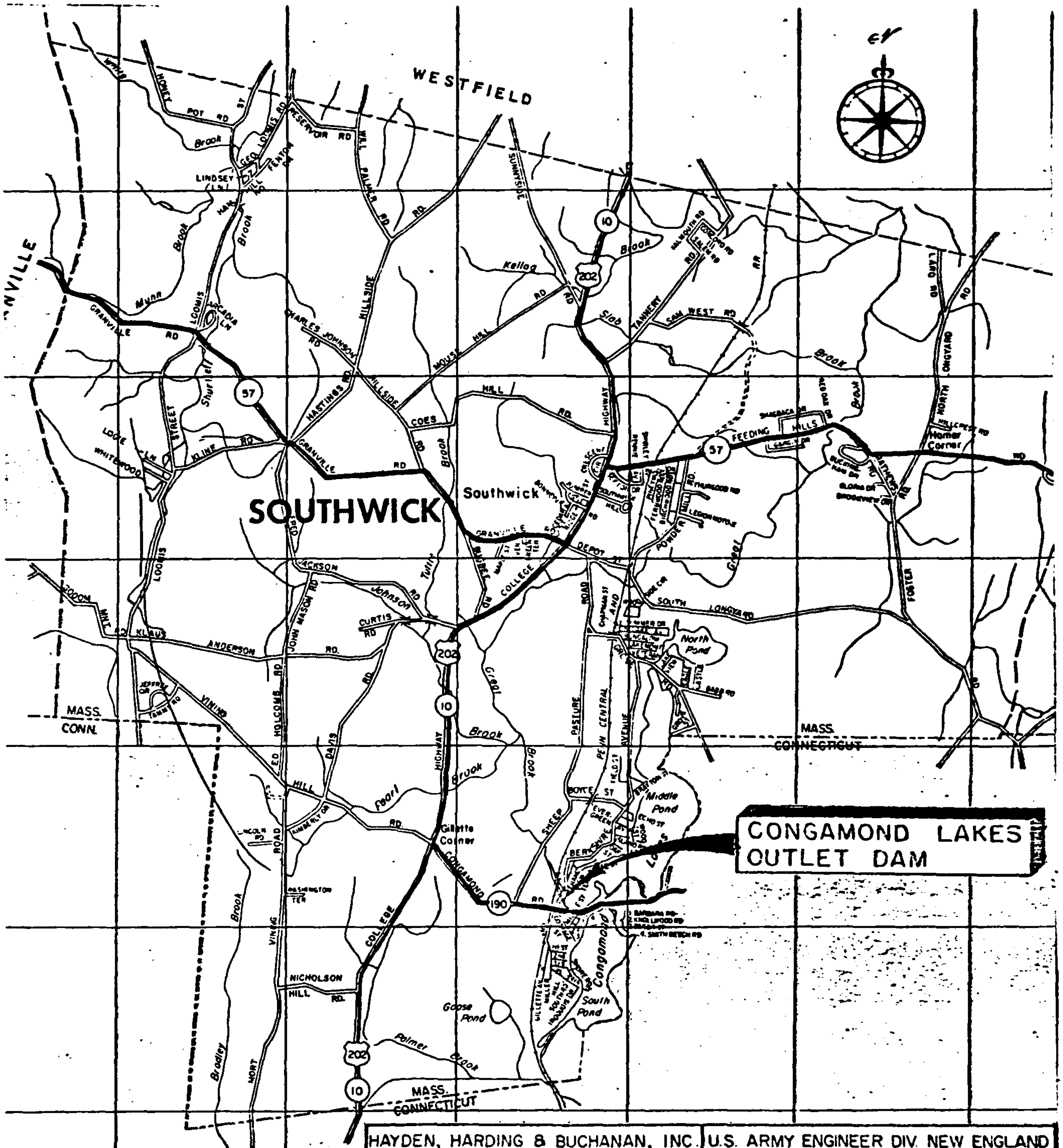


HAYDEN, HARDING & BUCHANAN, INC. CONSULTING ENGINEERS BOSTON, MASSACHUSETTS	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

CONGAMOND LAKES OUTLET

SOUTHWICK MASSACHUSETTS

SCALE: 1" = 5280'

DATE: FEBRUARY, 1979.

PHASE I
NATIONAL DAM INSPECTION PROGRAM
CONGAMOND LAKES OUTLET (MIDDLE POND)

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inpsection of dams within the New England Region. Hayden, Harding & Buchanan, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Massachusetts. Authorization and notice to proceed was issued to Hayden, Harding & Buchanan, Inc. under a letter of November 28, 1978 from Max B. Scheider, Colonel, Corps of Engineers. Contract No. DACW 33-79-C-0012 has been assigned by the Corps of Engineers for this work.

b. Purpose

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.

(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

Congamond Lakes Outlet (Middle Pond) is located in the Town of Southwick in Hampden County, Massachusetts. Congamond Lakes are comprised of the North, Middle and South Ponds. The eastern shore of the South and Middle Ponds generally forms the Connecticut-Massachusetts boundry with all three lakes being located in Massachusetts. The outlet structure is shown on the U.S.G.S. Quadrangle, Southwick, Massachusetts-Connecticut, with coordinates approximately North 42°01'18", West 72°46'12".

b. Description of Dam and Appurtenances

The dam is comprised of two twin eight foot wide concrete box culverts with concrete training walls and earth embankments. A two lane paved roadway travels over the crest of the structure and embankment. The embankments have side slopes on an approximate 2.5:1 slope. The upstream face is lined with rock fill on the left side and bituminous concrete on the right side. The downstream face is lined with riprap on both sides.

The structure contains two sets of grooved slots on the upstream face allowing for installation of stop logs.

c. Size Classification

The outlet is classified as Intermediate according to its storage capacity of 4,000 acre feet.

d. Hazard Classification

The hazard potential from dam failure flooding is classified as low. No structures appear to be close enough to the dam or stream to be damaged, loss of life is not indicated.

e. Ownership

The structure is owned by the Town of Southwick, Southwick, Massachusetts 01077.

f. Operator

Mr. Nuchi Prefti, the Chairman of the Board of Selectmen of the Town of Southwick is the designated operator. His address: Town Offices, Southwick, Massachusetts, 01077, 413-569-5955.

g. Purpose of Dam

The major purpose of the outlet structure is to regulate the height of water for recreation on the Congamond Lakes. The structure is the only outlet for the lakes and by raising or lowering the stop logs, the level of the shoreline is also regulated. This affects the many year-round and summer

homes located on the lakes shoreline.

h. Design and Construction History

The original structure was an old metal open floor bridge built around the turn of the century. This structure was washed out by the 1955 flood. The existing culvert structure was designed by Charles T. Main of Boston, Massachusetts in 1955. It was constructed in 1955. The age of the embankments is unknown.

i. Normal Operational Procedure(s)

There is no formal operational procedure for this structure. Stop logs are installed every Spring to raise the level of the lake for recreation. The height of logs is generally about two to three feet in the spring and the stop logs are removed in the late fall. During some periods of the summer the direction of flow of Great Brook reverses and the water level of the lake becomes too high. During these periods, additional stop logs are installed to keep these waters from entering the lakes and causing any additional raising of the water level.

1.3 Pertinent Data

a. Drainage Area

The drainage area (7,276 acres - 79.2 s.m.) is generally hilly to the north and west (Massachusetts side) of

the Congamond Lakes, and flat to hummocky to the south and east (Connecticut side). Several drainage paths feed the lakes, the largest being from Palmer and Mountain Brooks. The lakes are relatively narrow and long with an overall length of just over three miles. They are divided into three ponds - the North, Middle, and South Ponds - by roadway crossings at land necks. Water from the lakes outlets into Great Brook through twin concrete box culverts.

The area around Southwick and the lakes is moderately to heavily developed, while the rest of the drainage area is generally rural in nature. A line of the Penn Central RR, several state highways, and a number of improved roads service the area.

There are several buildings located within 200 feet of Great Brook near the outlet culverts on Berkshire Avenue. Approximately 500 feet downstream of these culverts, the Penn Central RR crosses the brook. Below this point there is little additional development until Great Brook nears the area around Southwick about 3.4 miles downstream of the culvert.

b. Discharge at Outlet

The outlet works for this structure consist of two concrete 8' X 5.5' box culverts with a roadway over them. Outflow is controlled by stop logs which can be placed into

slots on the upstream face of the culvert. The culvert invert is at elevation 224±.

The roadway culvert was constructed in 1955 after the existing road crossing was destroyed during the 1955 flood. No record of maximum impoundment or spillway discharge is know at this site. However, the U.S. Geological Survey obtained information to determine that the discharge on Great Brook at Longyard Road in Southwick, about 3.4 miles downstream of the culvert, was 3610. c.f.s. on August 19, 1955.

The maximum capacity without stop logs and under tailwater conditions, of the twin box culverts is 725 cfs at elevation 231±, the top of the road. (See Section 5.1.e)

c. Elevation (feet above MSL)

(1)	Streambed at centerline of culvert	223'
(2)	Maximum tailwater . . due to downstream conditions on outlet stream, flow has been known to reverse through culvert, requiring stop logs to prevent increase of elevation.	
(3)	Upstream portal invert diversion tunnel	none
(4)	Recreation pool	227±
(5)	Full Flood control pool	N/A
(6)	Culvert Invert	224.0±
(7)	Design surcharge (Original design)	unknown
(8)	Top Dam and Culvert	231.0±
(9)	Test flood design surcharge, (worst condition).	231.0±

d. Reservoir (feet)

(1)	Length of maximum pool . . . (1/2 PMF) . . .	19,000±
(2)	Length of recreation pool	17,000±
(3)	Length of flood control pool	N/A

e. Storage (acre-feet)

(1)	Recreation pool	1,784±
(2)	Culvert Invert . . . . . ("Dead Storage" not included in other storage figures)	0
(3)	Top dam and culvert	5,105
(4)	Test flood pool	4,700

f. Reservoir Surface (acres)

(1)	Culvert Inlet	427±
(2)	Recreation pool	734±
(3)	Flood control pool	N/A
(4)	Top dam and culvert	1,161
(5)	Test flood pool	1,161±

g. Dam

(1)	Type . . . twin 8' wide by 5.5' high concrete culverts with earth roadway embankment	
(2)	Length	120'
(3)	Height	7'
(4)	Top width	32'
(5)	Side Slopes, roadway embankment: 2.5:1 rock fill and bituminous concrete upstream 2.5:1 riprap downstream	

(6) Zoning. . . . . unknown; have earth fill roadway embankment, not dam or dike type

(7) Impervious Core . .

(8) Cutoff . . . . . none

(9) Grout curtain . . . . . none

h. Diversion and Regulating Tunnel

none

i. Spillway

none; concrete box culvert

j. Regulating Outlets

The regulating outlets for this structure are twin concrete 8' X 5.5' box culverts with a roadway over the top. The culvert invert at upstream face is elevation 224±. The water level in the lake is controlled by stop logs manually placed in slots at upstream end of box culverts.

SECTION 2
ENGINEERING DATA

2.1 Design

The existing culvert structure was designed by Charles T. Main in 1955. It was built to replace the original structure that was washed out by the flood of 1955. An attempt was made to located design plans and calculations from the Engineer and owner, however, no such data could be found.

2.2 Construction

The culvert structure was built in 1955. No construction data was located.

2.3 Operation

The structure is operated by the Board of Selectmen for the Town of Southwick. No written formal operational manual exists for this structure.

2.4 Evaluation

a. Availability

Little engineering data was located regarding the Congamond Lakes Outlet. State Inspection Reports for the years of 1973, 1975 and 1977 were made available at the State Department of Environmental Quality Engineering, Division of Waterways, Boston Office.

b. Adequacy

The lack of indepth engineering data does not allow for a definitive review. Therefore, the adequacy of this dam, structurally and hydraulically, can not be assessed from the standpoint of review of design calculations, but must be based primarily on the visual inspection, past performance history, and hydrologic and hydraulic assumptions.

c. Validity

The visual inspection of this facility showed no reason to question the validity of the information supplied on the State Inspection Reports.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General

The Phase I field inspection of this structure was performed on December 5, 1978. At that time, water was flowing through the structure in the downstream direction. The water level was approximately three inches above the stop log sill.

b. Dam

The dam consists of an earth embankment which acts as a highway fill leading to a twin box culvert bridge approximately in the center of the embankment. The height of the fill is about seven feet and the crest width is 32 feet. The upstream slope is 2.5 H:1V and the downstream slope is 2.3H:1V.

Except under flooding conditions, the hydraulic head across the structure is about 24 inches.

Visual inspection of the dam indicated that it is in good condition.

The crest of the dam has a paved roadway which showed no signs of misalignment or cracking which could be attributed to embankment movement. Photo #5 is a view of the roadway looking from the left abutment towards the right abutment.

The upstream slope of the embankment between the outlet culverts and the left abutment is shown in Photos #1 & #2. Trees have been allowed to grow on this slope.

The downstream slope is overgrown with brush and trees. The downstream slope between the outlet structure and the left abutment is shown in Photo #6. The downstream slope between the outlet structure and the right abutment is shown in Photo #7.

c. Appurtenant Structures

The abutment walls of the outlet structure are in good condition. Visual inspection showed the twin concrete box culvert to be in excellent condition. There were no cracks, no spalling, and good alignment. All expansion joints at the wingwalls also showed good alignment.

The intake area to the outlet structure is formed by the fill placed for a parking lot on the right upstream abutment. This slope, which is shown in Photo #4, is in good condition.

d. Reservoir Area

The reservoir for this structure consists of the three ponds comprising Congamond Lakes. The shoreline of the reservoir is lined by many year-round homes and small seasonal cottages. The visual inspection showed the area in the vicinity of the dam to be in general agreement with the U.S.G.S. Map.

A description of the drainage area is given in Section 1.3a of this report. The amount of siltation in the reservoir is not known.

e. Downstream Channel

The downstream outlet channel (Great Brook) is a relatively flat marshy area having marsh vegetation. Approximately 500 feet downstream of the structure, the brook takes a sharp turn and passes under a railroad embankment, through a stone arch, shown by Photo #8. The downstream channel is shown in Photo #10.

3.2 Evaluation

Visual examination indicates the dam to be in good condition.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedures

Congamond Lakes Outlet (Middle Pond) is maintained by the Board of Selectmen for the Town of Southwick. The designated caretaker is the Chairman of the Board. The Town attempts to maintain the Lakes at a sufficient height for lake recreation without adversely affecting conditions for the surrounding lake front cottages. Approximately two to three feet of stop logs are installed each spring to raise the water level to the desired height. During periods when the outlet channel reverses direction, additional logs are installed to prevent subsequent raising of the water level. There is no formal written operational procedure. The caretaker regulates the structure according to observed conditions and the reaction from the residents of the area.

4.2 Maintenance of Dam

The Town of Southwick is responsible for maintenance of the dam. The age and composition of the facility has resulted in minimal required maintenance over the past several years. The only recommended measures indicated on State Reports have been removal of minor vegetation growth upon the embankments.

4.3 Maintenance of Operating Facility

The only operating feature is the stop log facility which is in good condition and is relatively maintenance free.

4.4 Description of Warning Systems

There are no warning systems associated with this dam.

4.5 Evaluation

Although there is no formal operational procedure for this structure, the age and composition of the facility has resulted in a relatively low maintenance structure. The structure should be inspected every two years by qualified personnel who can identify conditions of concern which if left unchecked could jeopardize the safety of the structure.

SECTION 5
HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. General

The outlet for the Congamond Lakes consists of a two barrel concrete rectangular box culvert under a roadway. The culverts have provisions for stop logs on their upstream face. The culvert openings, modified by stop logs, act to control outflow and lake elevation for recreational uses and prevent flooding of shore properties from back flow of the receiving stream (Great Brook) during high water downstream. As far as can be determined, the embankments are highway-type earth embankments.

The Lakes are divided into the North, South and Middle Ponds with the outlet located in the southwest corner of the Middle Pond. Runoff from several ponds to the east flows into the Congamond Lakes.

b. Design Data

The hydraulic computations for this outlet were not available. Therefore, the required test flood was developed as noted in Section 5.1.e.

c. Experience Data

Records of maximum impoundment or outlet discharge are unavailable at this site. A road crossing at this location was destroyed during the 1955 flood but no additional information is available. The U.S. Geological Survey obtained information on Great Brook downstream of the Congamond Lakes in order to estimate the magnitude of the 1955 flood (WSP #1420). Using a slope-area determination the discharge at Longyard Road in Southwick, approximately 3.4 miles below the culvert, was calculated to be 3610 cfs on August 19, 1955.

d. Visual Observations

Visual observations of the drainage area and vicinity of the outlet show them to be in general agreement with the U.S.G.S. maps of the area. Description of the drainage area is given in Section 1.3 of this report.

e. Overtopping Potential

This dam carries an intermediate classification for size with a low hazard potential and as such should be capable of passing a 1/2 PMF. This test flood was computed by determining the watershed drainage area from U.S.G.S. maps in combination with Corps discharge guide curves. A 1/2 PMF inflow of 4,000 cfs was developed. The culverts were considered operating with 3 feet of stop logs in place and without the stop logs. Also, the U.S.G.S. map indicates areas where overland flow might occur, thus providing a case for one or possibly three outlets. With only the culvert considered, the outflow is 385 cfs

The culverts capacity is 300 and 725 cfs, with and without stop logs respectively. If outflow at two other possible outlets ("low spots in the terrain surrounding the lakes) is considered, the resulting flow to the culvert is 825 cfs, at elevation230.5. The culvert capacity is 250 and 575 cfs, with and without stop logs, respectively. In both cases, storage and outflow vary significantly when minor changes in water surface levels occur. Under certain conditions the roadway could be overtopped by about 1 to 2 inches of water.

f. Dam Failure Analysis

With water to crest of dam a dam failure was assumed. A peak failure discharge of 1500 cfs was developed using Corps "rule of thumb" guidance. Routing the dam failure flow downstream indicated that no homes would be damaged. Loss of life was not indicated.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observation

The visual observations did not disclose any immediate stability problems.

b. Design and Construction Data

No design and construction data were available.

c. Operating Records

No operating records exist for this facility.

d. Post-construction Changes

An original metal open floor bridge is believed to have been built at this location at the turn of the century. This structure was washed out during the Flood of 1955 and replaced by the existing structure.

e. Seismic Stability

The dam is located in Seismic Zone 2, and according to U.S.C.E. guidelines, it is assumed that there are no hazards from earthquake loading.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition

The visual inspection indicates the dam is in good condition.

The outlet structure for this dam is not capable of passing the test flood described in Section 5.1.e, and the dam could be overtopped by several inches. However, dam failure analysis using Corps guidelines indicates no serious damage or loss of life occuring due to failure. Downstream flooding due to the test flood is indicated.

b. Adequacy of Information

The information made available, along with the visual inspection, is adequate for a Phase I level investigation.

c. Urgency

The items listed in Section 7.3 should be implemented within two years after receipt of this Phase I Report by the owner.

d. Need for Additional Investigation

No additional investigation is needed to complete the Phase I inspection.

7.2 Recommendations

There is no need for further engineering studies.

7.3 Remedial Measures

a. Operation and Maintenance Procedures

1. Remove brush and trees from downstream and upstream slopes of the embankment.

2. The structure should be inspected every two years by qualified personnel who can identify conditions of concern, which if left unchecked could jeopardize the safety of the structure.

3. Stop logs should be limited to under 2 feet in height during periods of heavy precipitation to insure roadway not being flooded as described in Section 5.1.e.

7.4 Alternatives

Not applicable to this dam.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Congamond Lake Outlet
Middle Pond

DATE December 5, 1978

TIME 11:30 A.M.

WEATHER Clear and Cold

W.S. ELEV. 225 U.S. ____ DN.

PARTY:

1. Ron Cheney, HHB
2. Dave Vine, HHB
3. Dan LaGatta, GEI
4. Nuchi Prefti, Southwick
5. ____
6. ____
7. ____
8. ____
9. ____
10. ____

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Embankment	D. LaGatta	
2.	Outlet Structure	R. Cheney	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECK LIST

PROJECT Congamond Lakes Outlet DATE December 5, 1978

PROJECT FEATURE Embankment Bank NAME R. H. Cheney
Structural Engineer

DISCIPLINE Geotechnical Engineer NAME D. P. LaGatta

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	231
Current Pool Elevation	225
Maximum Impoundment to Date	Unknown
Surface Cracks	None related to excessive embankment movement.
Pavement Condition	State highway passes over crest and is in good condition.
Movement or Settlement of Crest	None observed.
Lateral Movement	No misalignment observed.
Vertical Alignment	
Horizontal Alignment	
Condition at Abutment and at Concrete Structures	Good.
Indications of Movement of Structural Items on Slopes	None observed.
Trespassing on Slopes	None observed.
Sloughing or Erosion of Slopes or Abutments	None observed.
Rock Slope Protection - Riprap Failures	No riprap. Upstream slope has turf cover.
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	None observed. At time of inspection hyd. head across embankment was a few inches.
Piping or Boils	
Foundation Drainage Features	None.
Toe Drains	None.
Instrumentation System	None.
Vegetation	Excessive tree growth on upstream and and downstream slopes.

PROJECT Congamond Lakes Outlet DATE December 5, 1978

PROJECT FEATURE Embankment Dam NAME D. P. LaGatta

DISCIPLINE Geotechnical Engineer / Structural Engineer NAME R. H. Cheney

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	The approach channel is very wide (>100 ft.). Formed by reservoir bank on left abutment and parking lot fill. Slopes of approach in good condition.
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	None
Debris	None
Condition of Concrete Lining	None
Drains or Weep Holes	None
b. Intake Structure	Twin box culvert
Condition of Concrete	good
Stop Logs and Slots	Provisions for, used at various times. Slots in good condition.

PERIODIC INSPECTION CHECKLIST

PROJECT Congamond Lakes Outlet DATE December 5, 1978

PROJECT FEATURE Embankment Dam NAME D. P. LaGatta
Geotechnical Engineer

DISCIPLINE Structural Engineer NAME R. H. Cheney

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	None
a. Concrete and Structural	
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
STOP LOGS	Manually controlled stop logs.
b. Mechanical and Electrical	None
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECKLIST

PROJECT Congamond Lakes Outlet DATE December 5, 1978

PROJECT FEATURE Embankment Dam NAME D. P. LaGatta
Geotechnical Engineer

DISCIPLINE Structural Engineer NAME R. H. Cheney

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	None
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECKLIST

PROJECT Congamond Lakes Outlet DATE December 5, 1978

PROJECT FEATURE Embankment Dam NAME D. P. LaGatta
Geotechnical Engineer

DISCIPLINE Structural Engineer NAME R. H. Cheney

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	Twin box culvert
General Condition of Concrete	Good
Rust or Staining	None
Spalling	None
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	None
Condition at Joints	Good
Drain holes	None
Channel	Outlet leads to swampy area downstream of embankment.
Loose Rock or Trees Overhanging Channel	None
Condition of Discharge Channel	Good.

PERIODIC INSPECTION CHECKLIST

PROJECT Congamond Lakes Outlet DATE December 5, 1978

PROJECT FEATURE Twin Box Culverts NAME Daniel P. LaGatta

DISCIPLINE Geotechnical Engineer NAME Ron H. Cheney

Structural Engineer

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	No spillway on this project. No defined approach channel other than lake.
General Condition	
Loose Rock Overhanging Channel	Twin box culvert acts as spillway, has training walls at inlet and outlet.
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir and Training Walls	
General Condition of Concrete	Good
Rust or Staining	None observed
Spalling	None observed
Any Visible Reinforcing	None observed
Any Seepage or Efflorescence	None observed
Drain Holes	None observed
c. Discharge Channel	
General Condition	
Loose Rock Overhanging Channel	Swampy area downstream of embankment
Trees Overhanging Channel	
Floor of Channel	
Other Obstructions	

PERIODIC INSPECTION CHECKLIST

PROJECT Congamond Lakes Outlet DATE December 5, 1978

PROJECT FEATURE Embankment Dam NAME D. P. LaGatta
Geotechnical Engineer

DISCIPLINE Structural Engineer NAME R. H. Cheney

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	Outlet structure is integral part of highway bridge. Twin box culvert. Culvert is in good condition, minor maintenance needed - painting of railing.
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Underside of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	None
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

ENGINEERING DATA

LIST OF ENGINEERING DATA

No design plans or calculations regarding the original or existing structure were located.

The Commonwealth of Massachusetts

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL QUALITY ENGR.
DIVISION OF WATERWAYS

100 Nashua Street, Boston 02114

July 27, 1977

Board of Selectmen
Town of Southwick
Town Offices
Southwick, Mass.

RE: Insp. Dam #2-7-279-5
Congamond Lakes Outlet Dam
Southwick

Gentlemen:

On May 6, 1977, an Engineer from the Massachusetts Department of Public Works made a visual inspection of the above dam. Our records indicate the owner to be Town of Southwick. If this information is incorrect will you please notify this office.

The inspection was made in accordance with the provisions of Chapter 253 of the Massachusetts General Laws as amended (Dams Safety Act). Chapter 706 of the Acts of 1975 transferred the jurisdiction of the so-called "Dams Safety Program" to the Commissioner of the Department of Environmental Quality Engineering.

The results of the inspection indicate that this dam is safe; however, the following conditions were noted that require attention:

Minor growth of brush and trees should be removed.

We call these conditions to your attention before they become serious and more expensive to correct. With any correspondence please include the number of the Dam as indicated above.

Very truly yours,

John J. Hannon, P.E.
Chief Engineer

jjh: bjm
cc: F.J. Hoey, D.H.E.
H. Shumway, D.D.P.E.

INSPECTION REPORT - DAMS AND RESERVOIRS

1. LOCATION:

City/Town Southwick. County Hampden. Dam No. 2-7-279-5

Name of Dam Congamond Lakes Outlet.

Topo Sheet No. 9 D. Coordinates: Mass. Rect. N 374,600, E 255,100.

Inspected by: Harold T. Shumway, On May 6, 1977. Date Last Inspection 5-20-75

2. OWNER/S: As of May 6, 1977

per: Assessors____, Reg. of Deeds____, Prev. Insp. X, Per. Contact X.

1. Board of Selectmen, Town of Southwick, Town Offices, Southwick, Mass.
Name | St. & No. | City/Town | State | Tel. No.

2. _____
Name | St. & No. | City/Town | State | Tel. No.

3. _____
Name | St. & No. | City/Town | State | Tel. No.

3. CARETAKER: (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.

Same as above
Name | St. & No. | City/Town | State | Tel. No.

4. DATA:

No. of Pictures Taken None. Sketches See description of Dam.
Plans, Where None located.

5. DEGREE OF HAZARD: (if dam should fail completely)*

1. Minor____. 3. Severe____.

2. Moderate X. 4. Disastrous____.

Comments: Damage would be mostly to town roads and bridges

*This rating may change as land use changes (future development).

(6.) OUTLETS: OUTLET CONTROLS AND DRAWDOWN

No. 1 Location and Type: Center of dam - twin 8'W. x 5½' H. concrete box culver

Controls Yes, TYPE: Stop logs across upstream end. Also a concrete weir 1'± high at base of culverts.

Automatic ____. Manual X. Operative Yes X, No ____.

Comments: No stop logs in place at time of inspection

No. 2 Location and Type: ____

Controls ____, Type: ____

Automatic ____. Manual ____. Operative Yes ____, No ____.

Comments: ____

No. 3 Location and Type: ____

Controls ____, Type: ____

Automatic ____. Manual ____. Operative Yes ____, No ____.

Comments: ____

Drawdown present Yes ____, No X. Operative Yes ____, No ____.
Comments: Water level controlled by stop logs - complete removal does not dr... pond complex.

(7.) DAM UPSTREAM FACE: Slope Vertical on structure 2:1 on slope, Depth Water at Dam 2½'±.

Material: Turf X. Brush & Trees ____. Rock fill X. Masonry ____. Wood...

Other Stone paving.

Condition: 1. Good ____. 3. Major Repairs ____.

2. Minor Repairs X. 4. Urgent Repairs ____.

Comments: Small tree growth noted on southerly portion of embankment.

(8.) DAM DOWNSTREAM FACE: Slope 2:1.

Material: Turf X. Brush & Trees X. Rock Fill X. Masonry ____. Wood...

Other ____.

Condition: 1. Good ____. 3. Major Repairs ____.

2. Minor Repairs X. 4. Urgent Repairs ____.

Comments: Brush and small tree growth on slopes.

(9.) EMERGENCY SPILLWAY: Available Yes. Needed _____.

Height Above Normal Water 4½ to 5 Ft.

Width _____ Ft. Height _____ Ft. Material Paved roadway

Condition: 1. Good X. 3. Major Repairs _____.

2. Minor Repairs _____. 4. Urgent Repairs _____.

Comments: Top of embankment is Berkshire Avenue roadway which is bituminous concrete paved.

(10.) WATER LEVEL AT TIME OF INSPECTION: 3½ Ft. Above _____. Below X.

Top Dam _____ F.L. Principal Spillway _____.

Other Top of box culvert opening

Normal Freeboard 4½ to 5 Ft.

(11.) SUMMARY OF DEFICIENCIES NOTED:

Growth (Trees and Brush) on Embankment Brush and small tree growth on slopes

Animal Burrows and Washouts None found

Damage to Slopes or Top of Dam None found

Cracked or Damaged Masonry None found

Evidence of Seepage None found

Evidence of Piping None found

Leaks None found

Erosion None found

Trash and/or Debris Impeding Flow None found

Clogged or Blocked Spillway None found

Other

DAM NO. 2-7-272-5

12. OVERALL CONDITION:

1. Safe_____.
2. Minor repairs needed ___X___.
3. Conditionally safe - major repairs needed_____.
4. Unsafe_____.
5. Reservoir impoundment no longer exists (explain)

Recommend removal from inspection list_____

13. REMARKS AND RECOMMENDATIONS: (Fully Explain)

Conditions found at dam on this inspection showed only minor brush and small tree growth. The concrete box culverts appeared to be sound with no spalling or crack evident. There were no stop logs in place and culverts appeared to be free of er debris. Dam appears to be safe at this time.

HDe/vk

September 25, 1975

Board of Selectmen
Town Offices
Southwick, Massachusetts

RE: Inspection - Dam #2-7-279-5
Southwick
Congamond Lakes Outlet Dam

Gentlemen:

On May 20, 1975, an engineer from the Massachusetts Department of Public Works made a visual inspection of the above dam. Our records indicate that the Town of Southwick is the owner. Will you please notify this office if this information is not current.

The inspection was made in accordance with Chapter 253 of the Massachusetts General Laws, as amended by Chapter 595 of the Acts of 1970 (Dams-Safety Act).

The results of the inspection indicate that this dam is safe; however, the growth of brush and trees on the embankment of the dam should be removed.

We call this condition to your attention now before it becomes serious and more expensive to correct. With any correspondence, please include the number of the dam as indicated above.

Very truly yours,

ROBERT T. TIERNEY, P.E.
Chief Engineer

LRA:jap
cc: R. J. Leey
R. Salls

INSPECTION REPORT - DAMS AND RESERVOIRS

(1.) LOCATION:

~~City~~/Town Southwick. County Hampden. Dam No. 2-7-279-5.

Name of Dam Congamond Lakes Outlet.

Topo Sheet No. 9D. Coordinates: Mass. Rect. N 374,600, E 255,100.

Inspected by: Harold T. Shumway, On 5/20/75. Date Last Inspection 7/3/73.

(2.) OWNER/S: As of May 20, 1975

per: Assessors____, Reg. of Deeds____, Prev. Insp. X, Per. Contact____.

	Name	St. & No.	City/Town	State	Tel. No.
1.	Board of Selectmen Town of Southwick	Town Offices	Southwick, Mass.		
2.					
3.					

CARETAKER: (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.

Name	St. & No.	City/Town	State	Tel. No.
Same				

(4.) DATA:

No. of Pictures Taken None. Sketches See description of Dam.

Plans, Where None located.

(5.) DEGREE OF HAZARD: (if dam should fail completely)*

1. Minor____.
2. Moderate X.
3. Severe____.
4. Disastrous____.

Comments: Damage would be confined to town roads and bridges.

*This rating may change as land use changes (future development).

(6.) OUTLETS: OUTLET CONTROLS AND DRAWDOWN

Center of dam-twin 8'w x 5½'±h concrete box culverts.

No. 1 Location and Type: _____

Controls Yes, TYPE: Stop logs across upstream end. Also concrete weir 1'± high at base of culverts.

Automatic ____. Manual X. Operative Yes X, No ____.

Comments: No stop logs in place at time of inspection.

No. 2 Location and Type: _____

Controls ____, Type: _____

Automatic ____. Manual ____. Operative Yes ____, No ____.

Comments: _____

No. 3 Location and Type: _____

Controls ____, Type: _____

Automatic ____. Manual ____. Operative Yes ____, No ____.

Comments: _____

Drawdown present Yes ____, No X. Operative Yes ____, No ____.

Comments: Pond level controlled by stop logs. Complete removal does not drain

(7.) DAM UPSTREAM FACE: Slope 2:1 on embankment, Vertical on stop logs, Depth Water at Dam 2'±.

Material: Turf ____. Brush & Trees ____. Rock fill X. Masonry ____. Wood ____.

Other Stone paving.

Condition: 1. Good X. 3. Major Repairs ____.

2. Minor Repairs ____. 4. Urgent Repairs ____.

Comments: Small brush growth noted.

(8.) DAM DOWNSTREAM FACE: Slope 2:1.

Material: Turf X. Brush & Trees X. Rock Fill X. Masonry ____. Wood ____.

Other ____.

Condition: 1. Good ____. 3. Major Repairs ____.

2. Minor Repairs X. 4. Urgent Repairs ____.

Comments: Brush and small tree growth noted.

(9.) EMERGENCY SPILLWAY: Available Yes . Needed No .

Height Above Normal Water 4½ to 5 Ft.

Width _____ Ft. Height _____ Ft. Material Paved roadway .

Condition: 1. Good X . 3. Major Repairs _____ .

2. Minor Repairs _____ . 4. Urgent Repairs _____ .

Comments: Top of embankment is Berkshire Avenue which is Bit. Conc. paved.

(10.) WATER LEVEL AT TIME OF INSPECTION: 4± Ft. Above _____ . Below X .

Top Dam _____ F.L. Principal Spillway _____ .

Other Top of box culvert opening

Normal Freeboard 4½ to 5 Ft.±

(11.) SUMMARY OF DEFICIENCIES NOTED:

Growth (Trees and Brush) on Embankment Yes, small brush and tree growth on slopes upstream and downstream.

Animal Burrows and Washouts None found

Damage to Slopes or Top of Dam None found

Cracked or Damaged Masonry None evident

Evidence of Seepage None found

Evidence of Piping None found

Leaks None found

Erosion None evident

Trash and/or Debris Impeding Flow None

Clogged or Blocked Spillway None

Other

(12.) OVERALL CONDITION:

1. Safe_____.
2. Minor repairs needed X
3. Conditionally safe - major repairs needed_____
4. Unsafe_____.
5. Reservoir impoundment no longer exists (explain)

   Recommend removal from inspection list_____

(13.) REMARKS AND RECOMMENDATIONS: (Fully Explain)

This is a twin concrete box culvert, each 8'w x 5½'h with Berkshire Avenue Roadway over the top. Side slopes of highway form embankment of dam either side of box culverts, for a total dam length of 90'± and a total height of 8'±. Water level of pond is controlled by stop logs on upstream end of concrete box culverts. There were no stop logs in place at time of inspection. Concrete structure appears sound with no cracks or spalling evident.

The embankment appears stable, but a light brush growth on upstream slope and a brush and small tree growth on downstream slope was noted.

Dam appeared safe at time of inspection.

HTS:ma

OK FILE

INSPECTION REPORT - DAMS AND RESERVOIRS

1. LOCATION:

~~City~~/Town Southwick. County Hampden. Dam No. 2-7-279-5.

Name of Dam Congamond Lakes Outlet.

Topo Sheet No. 9 D. Mass. Reet. Coordinates: N 374,600, E 255,100.

Inspected by: R. C. Salls, P. E., On July 3, 1973. Date Last Inspection 1969.

2. OWNER/S: As of Nov. 1972

per: Assessors X, Reg. of Deeds ____, Prev. Insp. ____, Per. Contact ____.

1. Board of Selectmen, Town Offices, Southwick, Mass.
   Name | St. & No. | City/Town | State | Tel. No.

2. ____
   Name | St. & No. | City/Town | State | Tel. No.

3. ____
   Name | St. & No. | City/Town | State | Tel. No.

3. CARETAKER: (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multi owners.

____
Name | St. & No. | City/Town | State | Tel. No.

4. DATA:

No. of Pictures Taken None. Sketches See description of Dam.
Plans, Where None located.

5. DEGREE OF HAZARD: (if dam should fail completely)*

1. Minor ____.
2. Moderate X.
3. Severe ____.
4. Disastrous ____.

Comments: Damage would be confined to town roads and bridges

*This rating may change as land use changes (future development).

(6.) OUTLETS: OUTLET CONTROLS AND DRAWDOWN

No. 1 Location and Type: Center of dam - Twin 8' wide $5\frac{1}{2}' \pm$ high concrete box culverts

Controls Yes, TYPE: Stop logs across upstream ends

Automatic ____. Manual X. Operative Yes X, No ____.

Comments: Crest of stop logs at time of inspection 4'9" below roof box culvert or 6'3" below top of dam

No. 2 Location and Type: ____

Controls ____, Type: ____

Automatic ____. Manual ____. Operative Yes ____, No ____.

Comments: ____

No. 3 Location and Type: ____

Controls ____, Type: ____

Automatic ____. Manual ____. Operative Yes ____, No ____.

Comments: ____

Drawdown present Yes ____, No ____. Operative Yes ____, No ____.
Comments: ____

(7.) DAM UPSTREAM FACE: Slope 2:1, Depth Water at Dam $2' \pm$.

Material: Turf ____. Brush & Trees X. Rock fill X. Masonry ____. Wood ____

Other ____.

Condition: 1. Good ____. 3. Major Repairs ____.

2. Minor Repairs X. 4. Urgent Repairs ____.

Comments: Brush and trees growing on slope could be removed

(8.) DAM DOWNSTREAM FACE: Slope 2:1.

Material: Turf X. Brush & Trees X. Rock Fill X. Masonry ____. Wood ____

Other ____.

Condition: 1. Good ____. 3. Major Repairs ____.

2. Minor Repairs X. 4. Urgent Repairs ____.

Comments: Brush and trees growing on slope could be removed

9. EMERGENCY SPILLWAY: Available Yes. Needed No.

Height Above Normal Water 4½ Ft.

Width _____ Ft. Height _____ Ft. Material _____.

Condition: 1. Good X. 3. Major Repairs _____.

2. Minor Repairs _____. 4. Urgent Repairs _____.

Comments: In extremely high water embankment could be overtopped without too great danger. Top is paved.

10. WATER LEVEL AT TIME OF INSPECTION: 4½ Ft. Above _____. Below X.

Top Dam X F.L. Principal Spillway _____.

Other _____.

Normal Freeboard 4½ Ft. ±

11. SUMMARY OF DEFICIENCIES NOTED:

Growth (Trees and Brush) on Embankment Yes - small amount of brush growing on slope embankments forming bridge approaches.

Animal Burrows and Washouts None found.

Damage to Slopes or Top of Dam None noted.

Cracked or Damaged Masonry None found.

Evidence of Seepage None seen.

Evidence of Piping None seen.

Leaks None seen.

Erosion None noted.

Trash and/or Debris Impeding Flow No.

Clogged or Blocked Spillway Great Brook has very little gradient and on occasion has been blocked by silt and rubbish.

Other _____.

(12.) OVERALL CONDITION:

1. Safe_____.
2. Minor repairs needed X .
3. Conditionally safe - major repairs needed_____.
4. Unsafe_____.
5. Reservoir impoundment no longer exists (explain)

   Recommend removal from inspection list_____.

(13.) REMARKS AND RECOMMENDATIONS: (Fully Explain)

There is almost no difference in the water elevation in the middle Congamond Pond and in Great Brook just downstream of the bridge and the stop log structure which for the dam. On occasions when the flow of Great Brook is retarded flow has been revers

At the time of the inspection water was about 18 inches above the top of the stop log which were 4 feet 9 inches below the ceiling of the box culverts and there was a noticeable current. Middle Pond was higher than usual.

The concrete culvert and stop log structure were in excellent condition and the appr embankments appear to be in good condition. No settlement or displacement was noted There was some brush and small trees growing on the slopes which could be removed.

RCS/js/vk

DISTRICT 2.

Submitted by R. C. Salls, P.E. Dam No. 2-7-279-5

Date July 3, 1973 ~~City~~/Town Southwick

Name of Dam Congamond Lakes Outlet

Location: Topo Sheet No. 9 D Mass. Rect. Coordinates N 374,600 E 255,100

Provide 8½" x 11" in clear copy of topo map with location of Dam clearly indicated.

Dam is embankment and twin 8' concrete box culverts for Berkshire Ave. located about 5-600 feet northerly of Congamond Rd. Great Brook beginning here.

Year built Unknown Year/s of subsequent repairs Unknown

Purpose of Dam: Water Supply _____ Recreational X
Flood Control _____ Irrigation _____ Other Former reservoir for Hampshire-Hampden ca

Drainage Area: Around 10 sq. mi. _____ acres.
Type: City, Bus. & Ind. _____ Dense Res. _____ Suburban 20% Rural, Farm 70%
Wood & Scrub Land 10% Slope: Steep 10% Med. 40% Slight 50%.

Normal Ponding Area: 270 Acres; Ave. Depth 5'±
Impoundment: Middle Pond only 440 million gals.; 1350 acre ft.
Silted in: Yes _____ No X Approx. Amount Storage Area _____

No. and type of dwellings located adjacent to pond or reservoir _____
i.e. summer homes etc. Numerous full time residences and summer cottages
Say 250 ±

Dimensions of Dam: Length 90 Max. Height 8'±
Freeboard 5'
Slopes: Upstream Face 2:1
Downstream Face 2:1
Width across top 30'

Dam No. 2-7-279-5

8.

Classification of Dam by Material:

Embankments
Earth _____ Conc. Masonry Bridge Structure Stone Masonry _____

Timber _____ Rockfill _____ Other _____

8A.

Dam Type: Gravity X Straight X Curved, Arched _____ Other ____

Overflow _____ Non-overflow _____

9.

A. Description of present land usage downstream of dam:

85 - 80 % rural; 15 - 20 % ~~urban~~ developed

B. Is there a storage area or flood plain downstream of dam which could accommodate the impoundment in the event of a complete dam failure? Yes _____ No X See Note below *

C. Character Downstream Valley: Narrow _____ Wide X Developed 15%

Rural 85% Urban _____

10.

Risk to life and property in event of complete failure.

No. of people 5

No. of homes 5

No. of businesses 1 retail

No. of industries None Type _____

No. of utilities 3 Type Electrical and telephone lines, Water mains

Railroads N.Y., N.H. & H. just below

Other dams None

Other Number of town bridges could be endangered.

11.

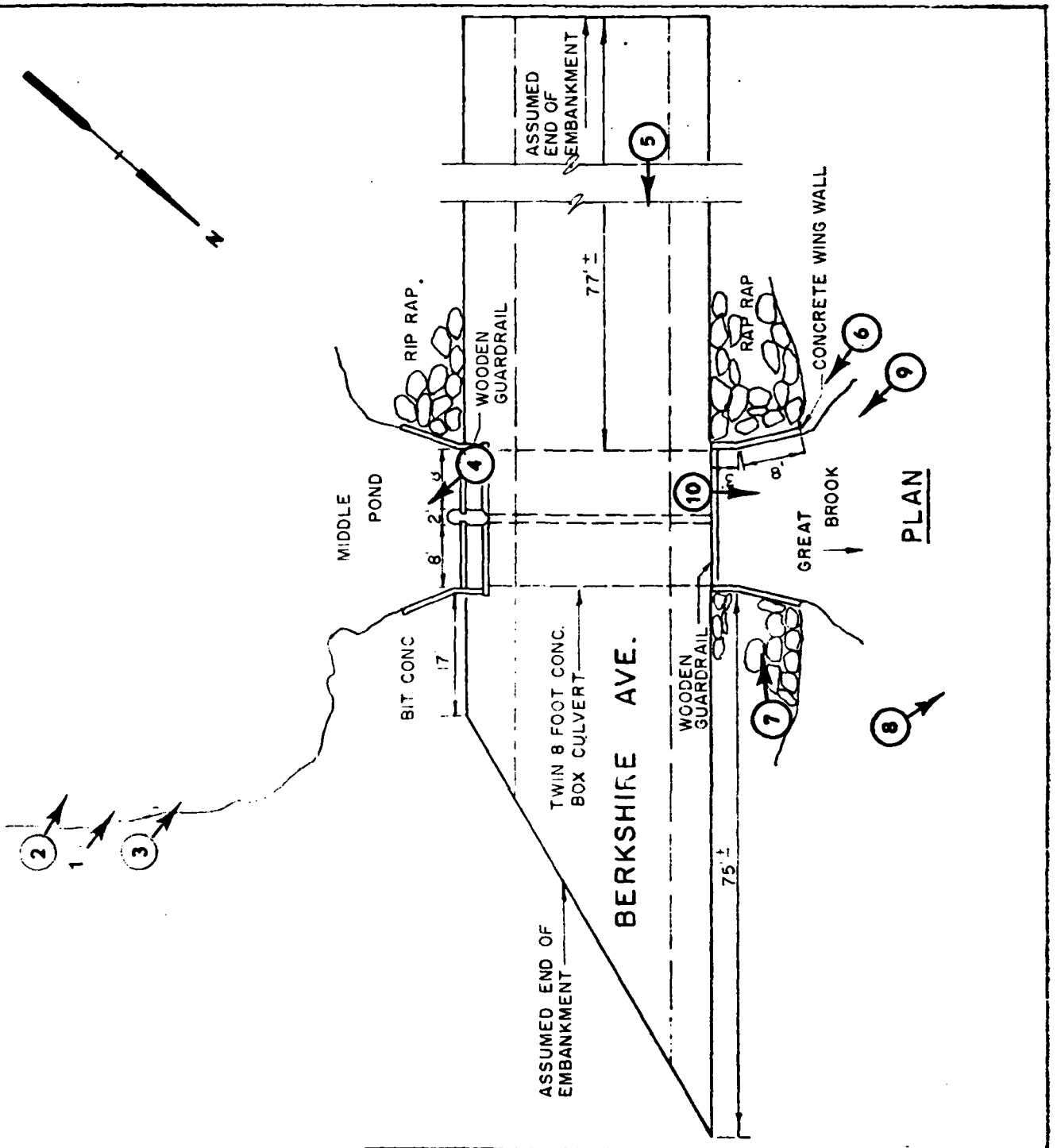
Attach Sketch of dam to this form showing section and plan on 8½" x 11" sheet.

RCS/vk
Attachments
Locus Plan
Sketches

* Valley below is generally wide and undeveloped but would not have capacity to accommodate all the water impounded in Congamond Lakes during very high water.

APPENDIX C

PHOTOGRAPHS



HAYDEN, HARDING & BUCHANAN, INC CONSULTING ENGINEERS BOSTON, MASSACHUSETTS	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

LOCATION OF PHOTOGRAPHS

CONGAMOND LAKES OUTLET

(MIDDLE POND)

SOUTHWICK MASSACHUSETTS

SCALE	NOT TO SCALE
DATE	FEBRUARY, 1979

PHOTOS NO. 1 & 2 - Upstream face of dam from outlet structure to left abutment.

PHOTO NO. 3 - Outlet structure.

PHOTO NO. 4 - Parking area fill which forms approach channel to outlet structure. Also view of southeastern portion of the reservoir in background.

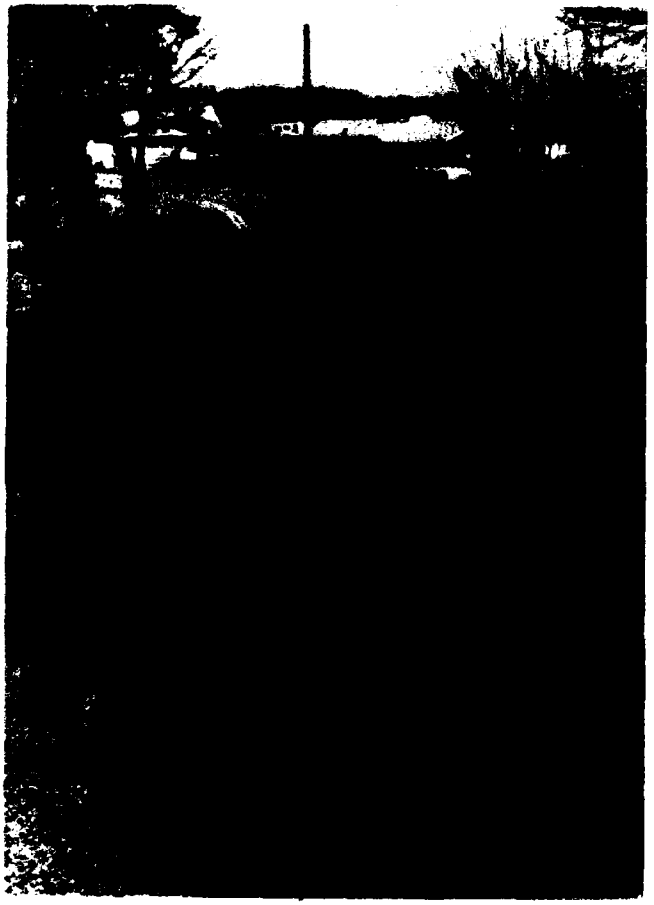


PHOTO NO. 5 - Roadway on crest of dam passing over outlet structure.

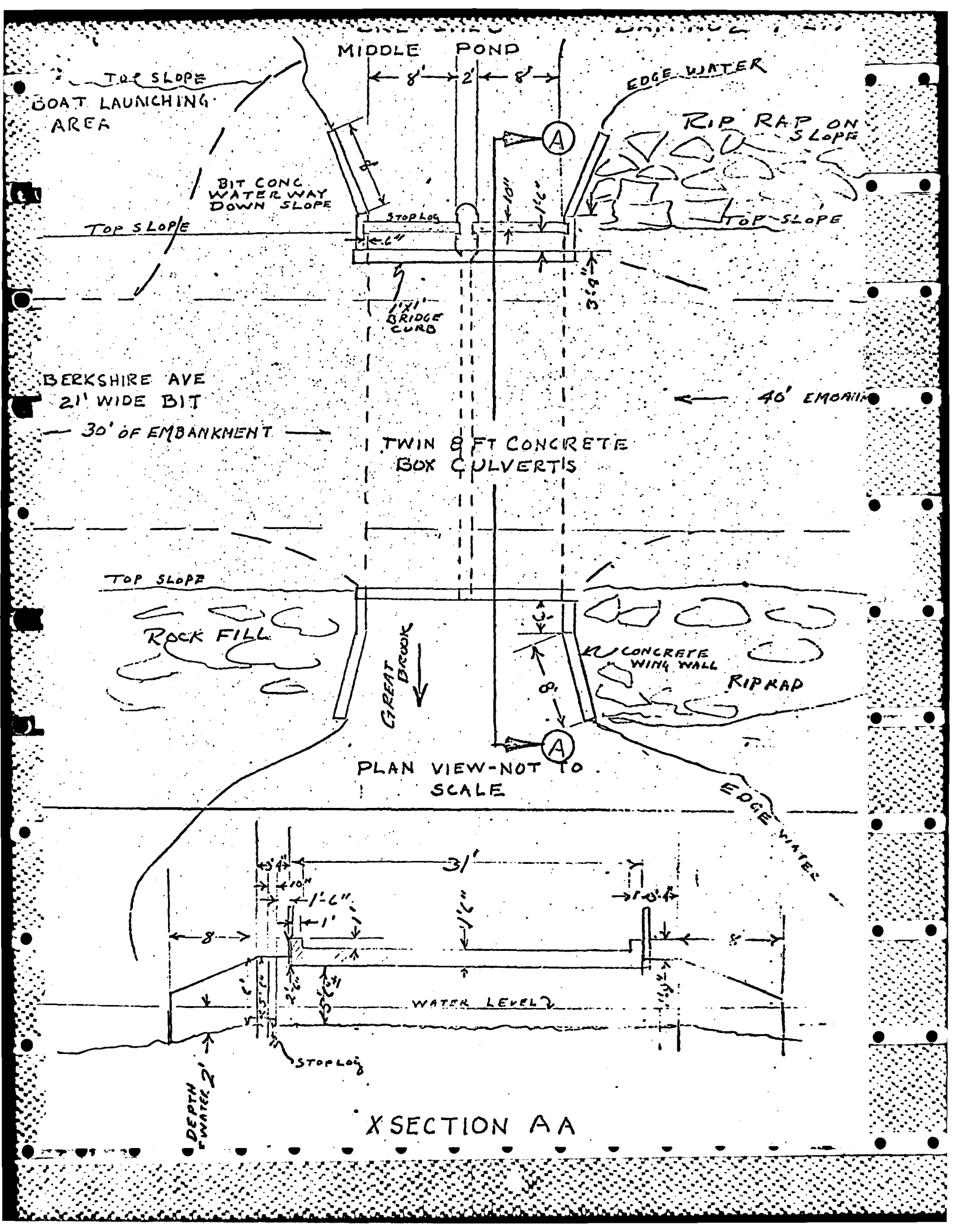
PHOTO NO. 6 - Downstream slope between outlet structure and left abutment.

PHOTO NO. 7 - Downstream slope between outlet structure and right abutment.

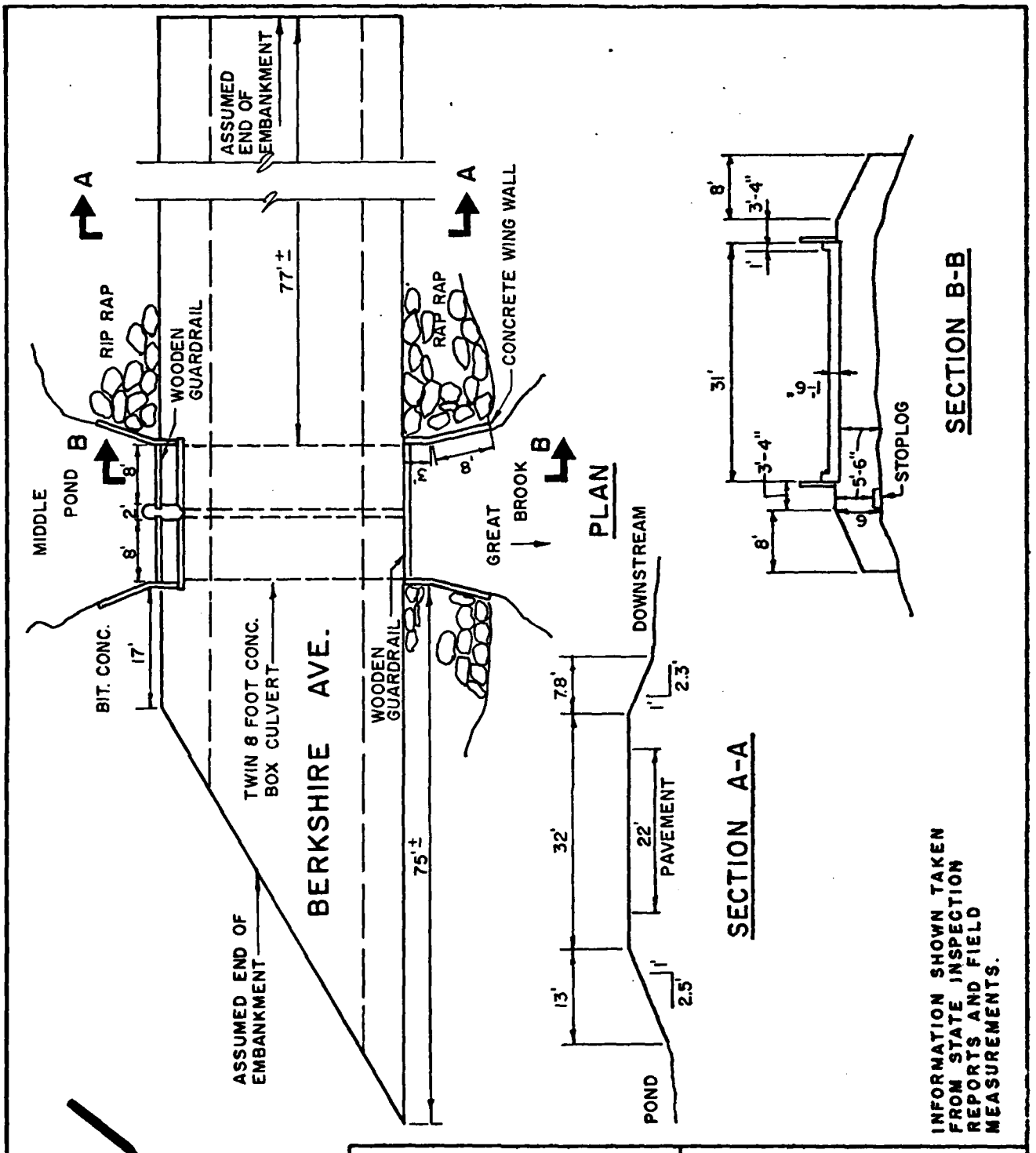
PHOTO NO. 8 - View of downstream arch bridge and embankment spanning Great Brook.

PHOTO NO. 9 - View of downstream face of structure.

PHOTO NO. 10 - Downstream channel taken from outlet structure.


MIDDLE POND
8'
2'
8'
TOP SLOPE
BOAT LAUNCHING AREA
EDGE WATER
RIP RAP ON SLOPE
A
BIT CONC WATER WAY DOWN SLOPE
8"
STOP LOG
10"
1'-6"
TOP SLOPE
TOP SLOPE
6"
8"
3'-6"
1'X1' BRIDGE CURB
BERKSHIRE AVE
21' WIDE BIT
30' OF EMBANKMENT
40' EMBANKM
TWIN 8 FT CONCRETE BOX CULVERTS
TOP SLOPE
ROCK FILL
GREAT BROOK
3'
8'
CONCRETE WING WALL
RIPRAP
A
PLAN VIEW-NOT TO SCALE
EDGE WATER
3'-4"
10"
1'-6"
1'
31'
1'-3"
1'-3"
8
1'-6"
4'
2'-6"
WATER LEVEL
STOP LOG
DEPTH OF WATER 2'
X SECTION AA


DAM NO 2-7-279
Southwick
DEPOT ST
HARTFORD
BUGBEE ROAD
COLLEGE
JOHN MASON ROAD
LONGYARD ROAD
North Pond
POINT
GROVE
Brook
SHEEP PASTURE ROAD
NEW HAVEN
Millers Hill
Pearl ROAD
Southwick Ctr
Gillett Corner
LAKES
Middle Pond
MASSACHUSETTS
CONNECTICUT
258 ROAD
Congamond
CONGAMOND
South Pond
NEW YORK
Spencer Pond
Conn Cove
HOLSON HILL RD
Goose Pond
Palmer Brook



HAYDEN, HARDING & BUCHANAN, INC. CONSULTING ENGINEERS BOSTON, MASSACHUSETTS	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

CONGAMOND LAKES OUTLET
(MIDDLE POND)

SOUTHWICK MASSACHUSETTS

SCALE: NOT TO SCALE

DATE: FEBRUARY, 1979.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

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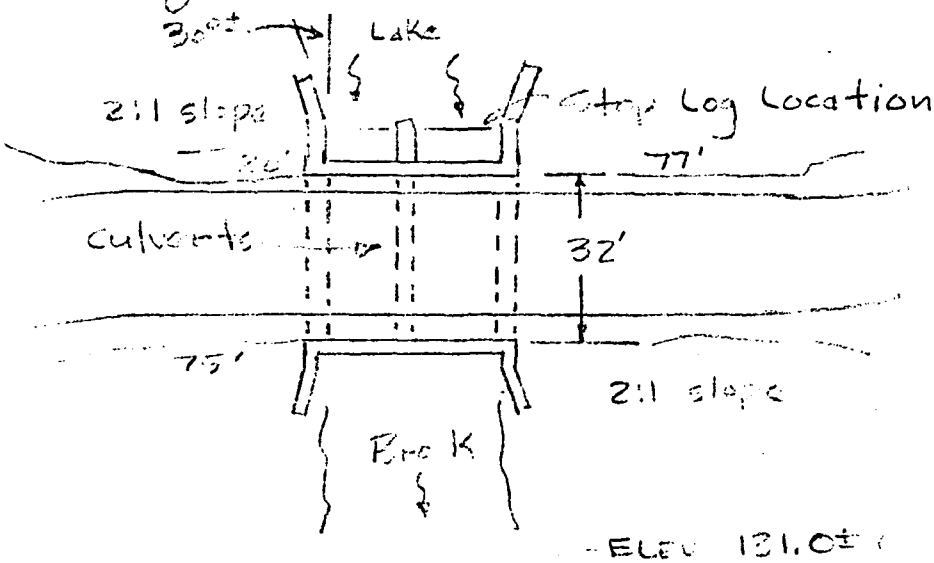
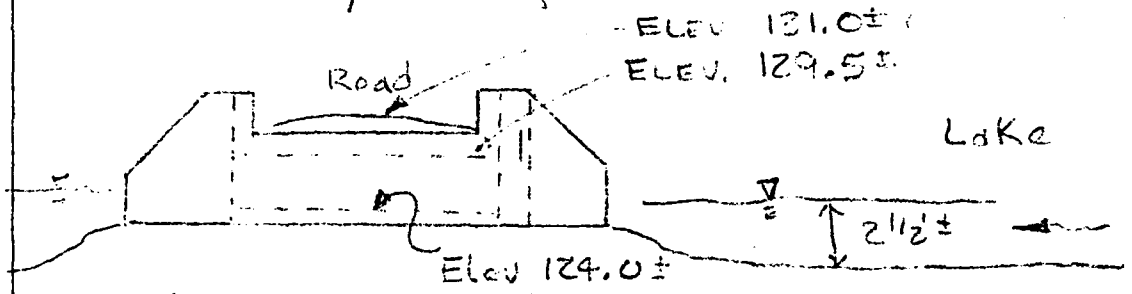
HH&B HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON, MASSACHUSETTS

SHEET NO. 1 of
JOB Dams
SUBJECT Condemned
CLIENT Corps

Twin 8' x 5½'h box culvert installed in 1955±
designed by C.T. Main - part of road improvements
Stop log sill elevation 124.0 ft., use stop logs in summer 2'±





(add 100' to get USGS base on above Elevs.)

Drainage Area = 22.89 + 29.74 + 26.61 = 79.24 sq mi, 7276 ac
or 11.37 sq mi

Elev 225 = 5.06 sq mi, 465 ac, 0.726 sq mi

Elev 200 = 11.56 sq mi, 1061 ac, 1.66 sq mi

Elev 200± = 3 sq mi, 275 ac, 0.43 sq mi.

Elev 240±

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BOSTON, MASSACHUSETTS

SHEET NO. 2-01
JOB Dams
SUBJECT Conantum 3
CLIENT Corps

FDD

Storage — assume dam depth = 5'

	Elev	Acres	Ave-Acres	Ave Stor	Accum Stor
	220	275.	—	—	—
INV.	224	427.	—	—	—
	225 (227)	465.	446.	446' a-f (1784)	446' a-f
	228	823.'	644.'	1932'	2378'
	229.5	1002.'	913'	1370'	3478'
	230	1062.'	1030	515	3993
Top Road	231	1161'	1112'	1112'	5105
	232.25	1285'	1223.'	1529'	6634'
	233.1	1370	1328'	1177	7811
	240	2055			

Storage Capacity ≅ 4000 af elev 224 to 230
- storage below 224 is not likely to flow out due to ground elev. downstream - water sometimes flows "into lakes" thru outlet culverts. Above elev 230 there are other locations which could become outlets ie North Pond near Longyard Road and Mountain Brook near Phelps Road - See USGS Map.
with 2-3 ft of stop logs in place, live storage is about 2216 a-f (elev 227 to 230)

Size Class = Intermediate (storage)
Hazard Potential = low : dam actually low road way w/ culvert about 5'± high - damage due basically to flood water not dam failure.
Test Flood = 1/2 PMF
use rolling to flat
1/2 PMF = 350 cfs/sm ≅ 4000' cfs

There are 2 structures dis. of culvert "new" stream (below elev 240) until town of Smithwick about 3.4 miles then about 16 ea structures could be effected by flood waters.

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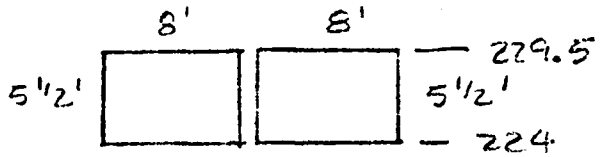
CONSULTING ENGINEERS
BOSTON, MASSACHUSETTS

SHEET NO 3 of
JOB Dams
SUBJECT Conigamond
CLIENT Corps

Culvert Discharge



assume outlet submerged w/ flashboards $A_T = 40$ sf

$R = \frac{4.1}{27} = 1.63 \quad (1.92)$

$n = .015$

$S = 0.005$ ½ assumed

$L = 32'$

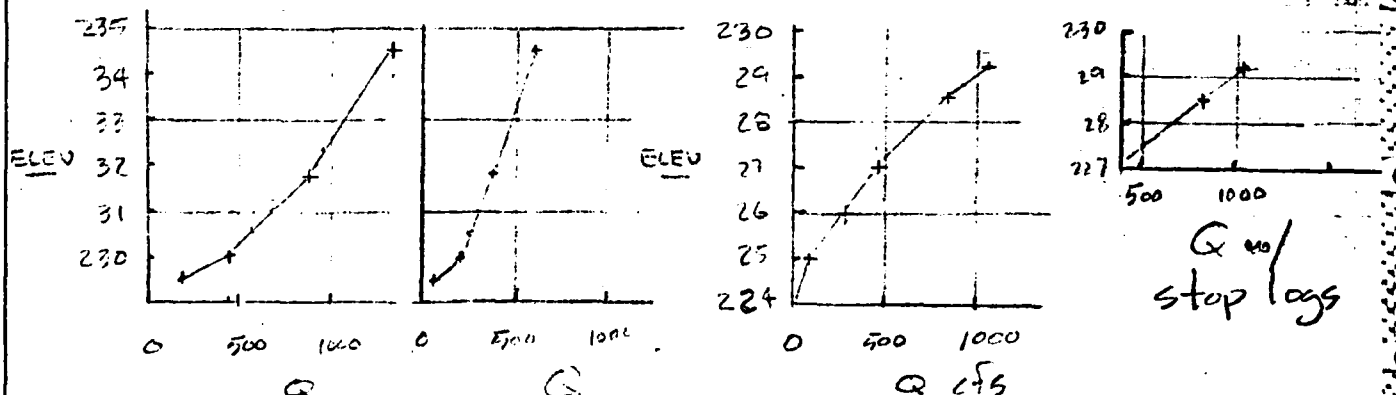
$H_f = \frac{29(n)^2}{R^{1.33}} L \frac{V^2}{2g}$ $\quad (.11)$

$H_E = K_e \frac{V^2}{2g} \quad K_e = 0.35$

V	$\frac{V^2}{2g}$	H_E	H_f	H_L	Area	Q cfs	Q stop logs
2	1.06	0.06	0.01	0.09'	88	176	80
5	3.82	0.14	0.09	0.57'	88 sf	440	195
10	15.5	0.54	0.17	2.26'	"	880	395
15	33.49	1.22	0.38	5.09'	"	1320	595 ±

D/1'	A/E sf	wp/10'	R/.8	$R^{2/3}$/.86	V/6'	Q_T/96
2	16	12'	1.33	1.21	8.5	271
3	24	14'	1.71	1.43	10.0	480
4.5	36	17'	2.12	1.65	11.55	832
5.25	42	18.5	2.27	1.73	12.12	1018

$V = \frac{1.486}{.015}(.005)^{1/2} R^{2/3} = 7R^{2/3}$ "free outlet"



Q "tailwater" w/ stop logs

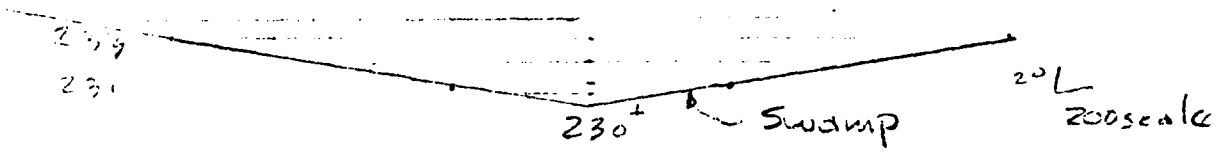
Q cfs "Free Outlet"

Q w/ stop logs

(3' stop logs reduce culvert flow by 55% ±)

Outlets

1) Phelps Road - Swamp 2000' South

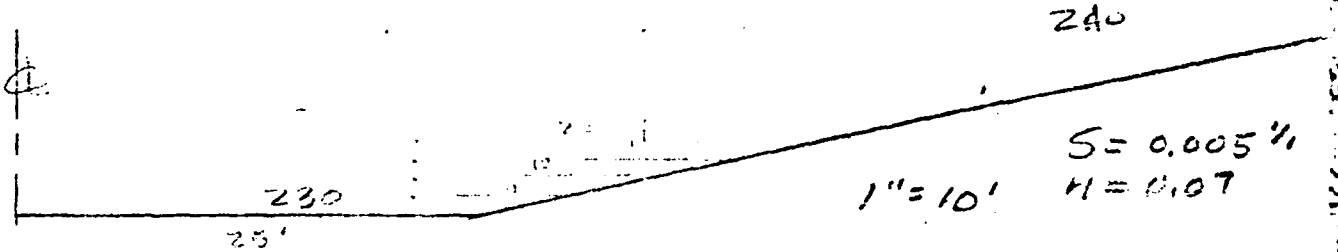


If $S = 0.005'/'$, $n = 0.07$

$$V = \frac{1.486}{.07}(.005)^{1/2} R^{.67} = 1.5\, R^{.67}$$

D	WP	A	R	V	Q	ELEV
1	300	300 SF	1	1.5	450	231
2	500	500	1	1.5	750	232
3	900	1350	1.5	2.0±	2700	233
4	1100	2200	2.0	2.36	5200	234
OE	160	75	0.47	0.9	70±	230.5

2) Congamond Road - embankment



D	WP	A	R	$R^{.67}$	V	Q	ELEV
1	60'	55	0.92	0.94	1.46	80	231
2	70'	120	1.71	1.43	2.13	256	232
3	80'	195	2.44	1.86	2.7	527	233
4	90	280	3.11	2.14	3.17	890	234
OE	50	25	0.5	0.63	0.95	25±	230.5

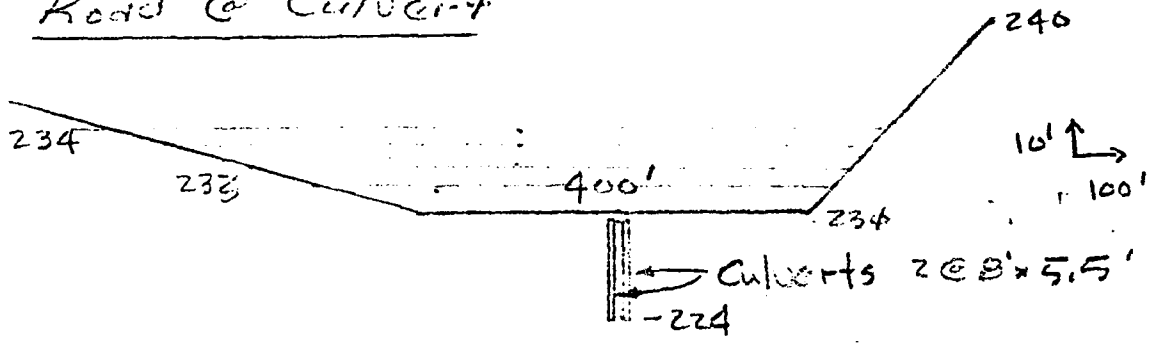
$$V = \frac{1.486}{.07}(.63)(.005)^{1/2}$$

DATE 12/20/72
VIA
BY FDD

HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON MASSACHUSETTS

JOB Dams
SUBJECT Containment
CLIENT Corps

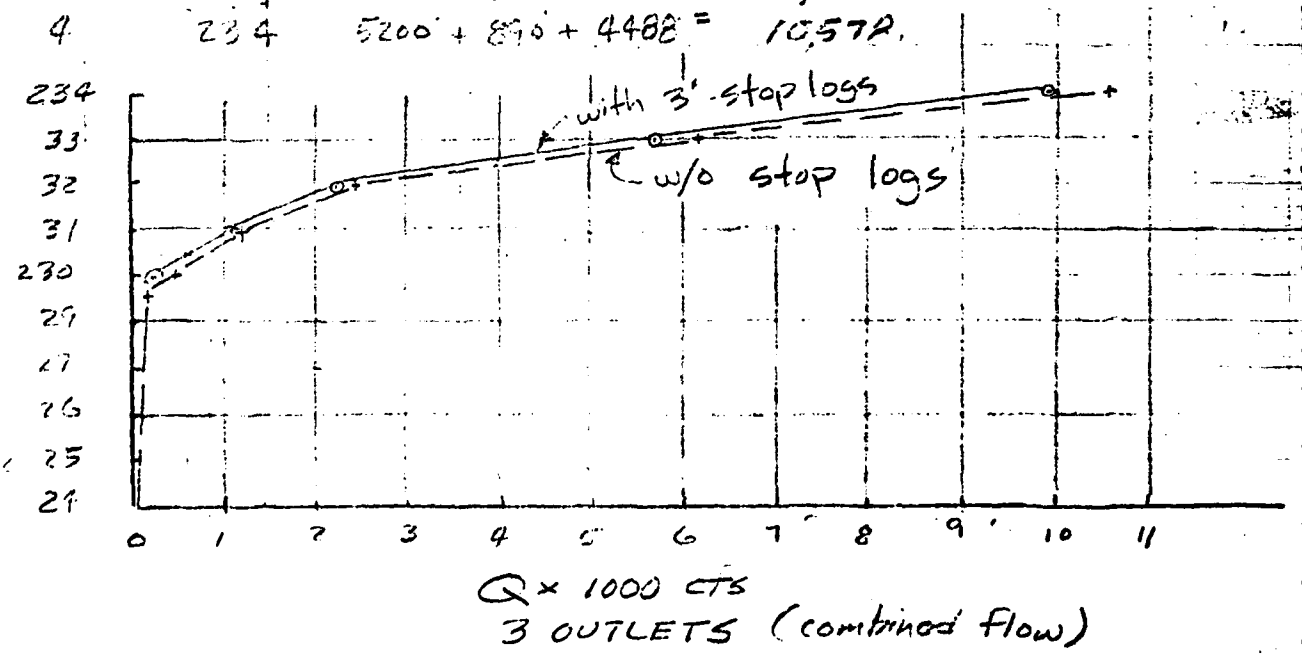
Road @ Culvert



	D	WP	A	R	$R^{.67}$	V	Q cfs	Culvert
232	1	480'	432	0.9	0.93	1.38	593	+ 880 ≈ 1475
233	2	530'	880	1.66	1.40	2.09	1836	+ 1100 ≈ 2936
234	3	580'	1275	2.23	1.71	2.5	3238	+ 1250 ≈ 4488
	4	640'						

Combined Discharges

D	Elev	Q cfs	
1	231	450 + 80 + 680 =	1210
2	232	750 + 256 + 1475 =	2481
3	233	2700 + 527 + 2936 =	6163
4	234	5200 + 890 + 4488 =	10578



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HH&B HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON MASSACHUSETTS

SHEET NO. 5A
JOB Dams
SUBJECT Command
CLIENT Corps

Dam Outflow

Case I - 3 outlets

Q_{P1} = 4000 cfs. El_1 = 232.5. $Stor_1$ = 7000 a-f or 11.54"

ave Stor = $\frac{7000+0}{2}$ = 3500 or 5.77".

Q_{P3} = $4000\left(1-\frac{5.77}{9.5}\right)$ = 1570 cfs. El_3 = 231.25.

$Stor_3$ = 5400.

$Stor_{ave}$ = $(5400+3500)/2$ = 4450 a-f or 7.34"

Q_{P4} = $4000\left(1-\frac{7.34}{9.5}\right)$ = 910 cfs El_4 = 230.5.

$Stor_4$ = 9500 a-f

$Stor_{ave}$ = $\frac{9500+4450}{2}$ = 4475 or 7.38"

Q_{P5} = $4000\left(1-\frac{7.38}{9.5}\right)$ = 892 cfs El_5 = 230.4.

$Stor_5$ = 4400 $Stor_{ave}$ = $\frac{4400+4475}{2}$ = 4438.

or 7.32.

Q_{P6} = $4000\left(1-\frac{7.32}{9.5}\right)$ = 918. cfs El_6 = 230.5.

Stor = 4500 or 7.32" = 7.34"

El ov. 230.5. overland flow = 95 cfs

Flow to Culvert Q = 825 cfs.

(See Case II 1 outlet next sht.)

w/ stop logs Qout = 250. wtr surface must rise
w/o stop logs Qout = 600. balanced
(see sht 3 - culvert graphs)

Con. II 1 outlet - road culvert only w/ stoplogs

Q_{P_1} = 4000 cfs · El$_{ow_1}$ = 233.75 ·

$Stor_1$ = 8800 a-f or 14.5" > 9.5 NG ·

$Stor_{ave}$ = $\frac{8800+0}{2}$ = 4400 a-f or 7.26"

Q_{P_3} = $4000\left(1-\frac{7.26}{9.5}\right)$ = 1945± cfs El 232 ·

$Stor_3$ = 6250 a-f ·

$Stor_{ave}$ = 5375 a-f or 8.87"

Q_{P_4} = $4000\left(1-\frac{8.87}{9.5}\right)$ = 265 cfs El$_4$ = 230.6

$Stor_4$ = 4,700 a-f $Stor_{ave}$ = 5040± or 8.

Q_{P_5} = $4000\left(1-\frac{8.3}{9.5}\right)$ = 500 cfs El = 231.3

$Stor_5$ = 5375 $Stor_{ave}$ = 5208 = 8.59

Q_{P_6} = $4000\left(1-\frac{8.59}{9.5}\right)$ = 383 cfs El$_6$ = 231.

$Stor_6$ = 5175 a-f $Stor_{ave}$ = 5192 8.56

Q_{P_7} = 395 cfs El$_{ow}$ = 231.2
$Stor_7$ = 5250 · $Stor_{ave}$ 5221± 8.61"

Q_{P_8} = $4^K\left(1-\frac{8.61}{9.5}\right)$ = 385 El = 231.1
Stor 5175 $Stor_{ave}$ = 5215 or 8.6"

Q_{out} = 395 cfs @ elev 231.1 ·
culvert capacity @ 231.0 is 380± cfs ;
at 231.1 Q = 400± cfs roadway could overflow
by 0.1 ft (1") ·

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BOSTON, MASSACHUSETTS

SHEET NO. 6 of
JOB Dam 5
SUBJECT Commonwealth
CLIENT Corps

At Culvert & Roadway Outlet - 3 outlets & one outlet

Case I 3 outlets Q_{out} = 920± cfs elev 230.5

$Q_{Roadway/stop\ logs}$ = 250 cfs
(other flow is overland)

Case II 1 outlet Q_{out} = 385 @ Elev 231±
w/ 3' stop logs Q_{outlet} = 300± cfs

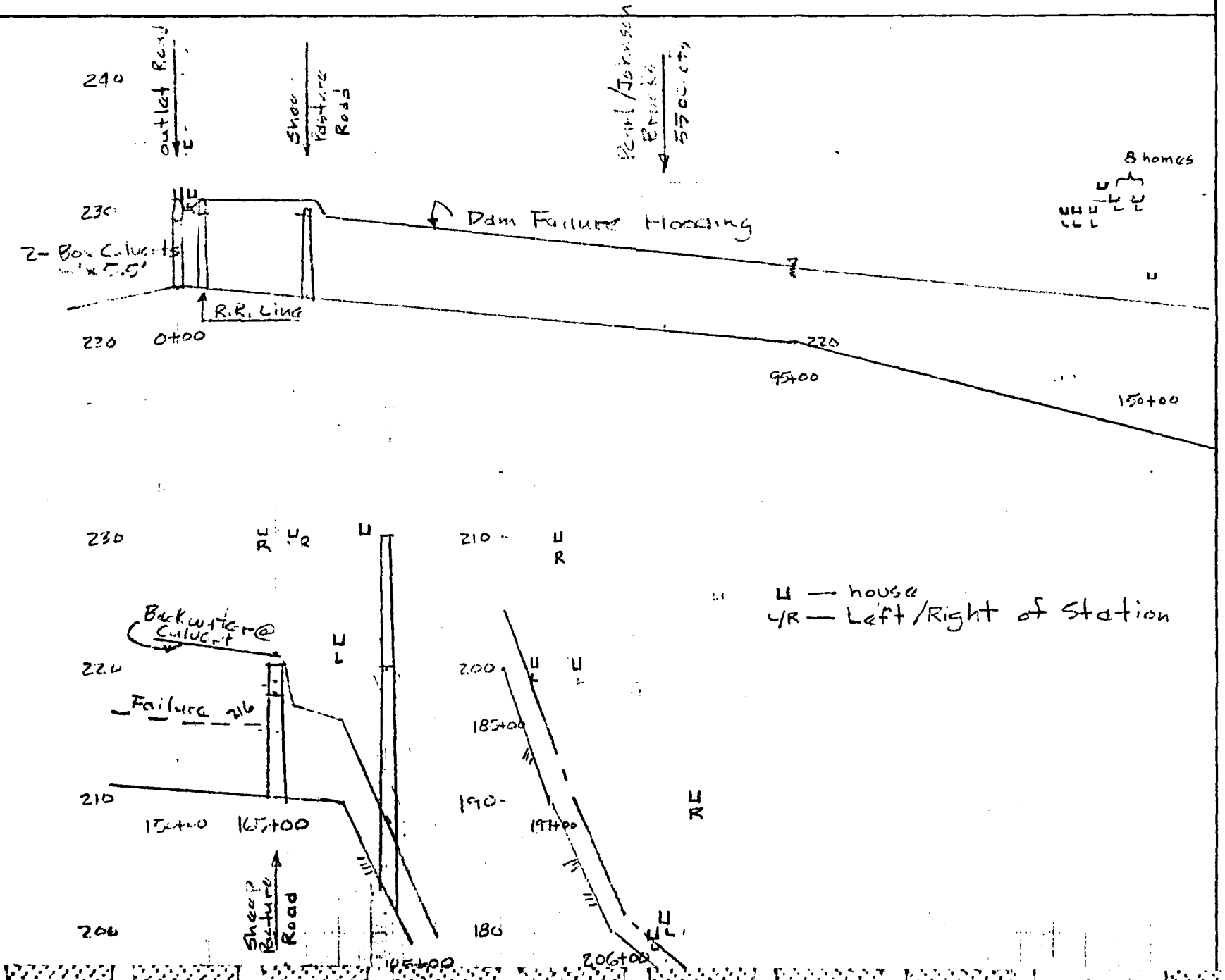
If USGS contours are not accurate or [illegible] development changes the two "overland" outlets, analysis for one outlet is shown also.

Failure Analysis $W_b = 0.4\,(120) = 48.$

at Roadway only

$Q_{in} = 8/27\,(48)\sqrt{32.2}\,(7.0)^{3/2} \cong 1500$ cfs

Tailwater exists here due to channel conditions - flat areas, R.R. structure etc.
In either condition - 2 or 1 outlet, the downstream flood from dam bursting will be dissipated before any homes are reached.
No damage from dam failure. From USGS, no structures would be damaged.
Homes are above flood stages.



HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON, MASSACHUSETTS

JOB Lewis
SUBJECT Cross Almond
CLIENT Corps

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CONSULTING ENGINEERS
BOSTON, MASSACHUSETTS

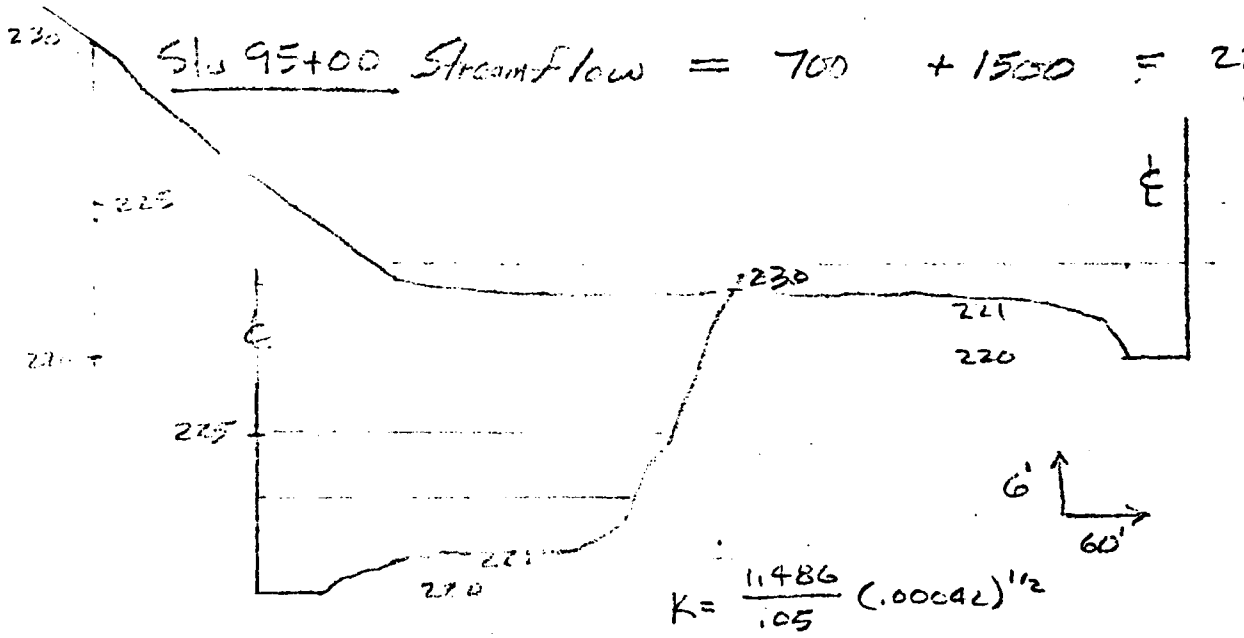
SHEET NO. 8
JOB Dams
SUBJECT Contained
CLIENT Corps

Great Brook @ Johnson & Pearl Brooks

Added drainage area ≈ 5509 a or 8.6 sq. mi.
Peaks do not coincide!

$Q = \frac{1}{2} \times 1650 \times 8.6 = 5375 \text{ cfs} \times \frac{1}{8} \simeq 700 \text{ cfs}$

9500 below Lake outlet elev = 222.0
At outlet elev ≈ 224.0
$S = 0.00042$ ft/ft



S/s 9500 Streamflow = 700 + 1500 = 2200 cfs

$K = \frac{1.486}{.05}(.00042)^{1/2}$

L	A	WP	$R^{2/3}$	K	V	Q
3'	550	400'	1.24	0.61	0.76	415
5'	1340	450'	2.08	"	1.27	1700 D=6'
10'	3640	595'	3.36	"	2.05	7472
12'	4650	650'	3.75	"	2.29	10,715

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CONSULTING ENGINEERS
BOSTON, MASSACHUSETTS

SHEET NO. 9
JOB Dams
SUBJECT Conigamond
CLIENT Corps

Sta 165+00 = At Pasture Road

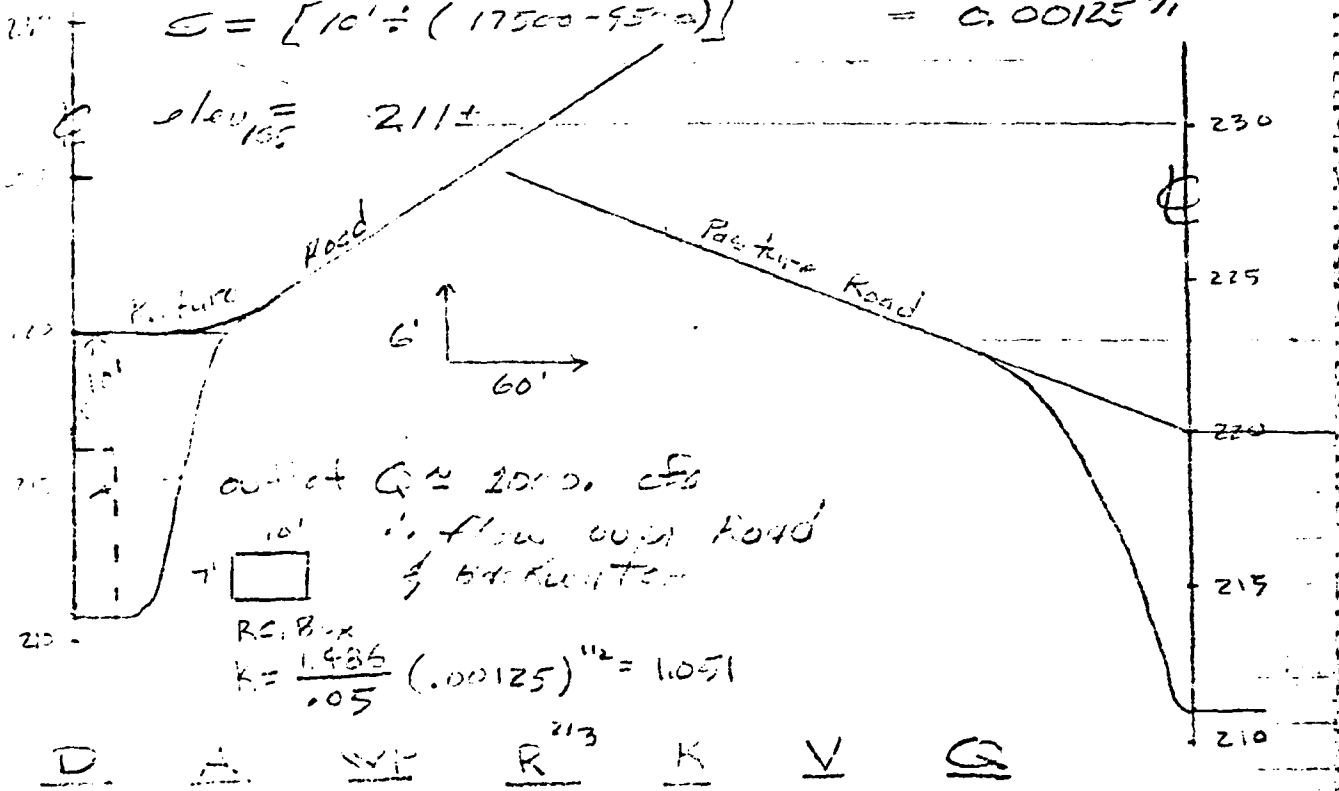
Drainage Area = 1137 a or 1.78 sq. mi.
Peaks do not coincide!
plus above areas of 8.6 sq. mi = 10.4 sq. mi.

$Q = 2100 + 600 \times 10.4 \times \frac{1}{8} = 2850$ cfs

Stream El 210 at Sta. 175+00

$S = [10' \div (17500 - 9500)] = 0.00125$ ft/ft

El $_{165}$ = 211±



outlet Q ≈ 2000 cfs
flow over Road
& backwater

RC Box

$K = \frac{1.486}{.05}(.00125)^{1/2} = 1.051$

D	A	WP	$R^{2/3}$	K	V	Q
3'	300	180	1.41'	1.051	1.5	450
10'	2470	500	2.92	"	3.06	7570
12'	3450	575	3.32	"	3.49	12,044

D ≈ 6'

Sta 95+00

$A_{AVG} = \frac{1500 + 48(7)}{2} = 918$ sf.

$S = V_2 I = 918 \times \frac{9500}{43560} = 200$ a-f $< \frac{1}{2}(5200)$ ok

$Q_{P_2} = 2700\left(1 - \frac{200}{5200}\right) = 2100^{\pm}$ cfs

$EI_2 = 225.5^{\pm}$ $A = \frac{1300 + 48(7)}{2} = 818$.

$S_2 = 178$ a-f

$S_{AVG} = 189$ a-f

$Q_{P_3} = 2200\left(1 - \frac{189}{5200}\right) = 2118$ cfs

Sta 165+00

$Q_{P_1} = 2880$ $A_1 = 1230$ $A_{AVG} = \frac{1230 + 1300}{2} = 1265$

$S_1 = 1265 \cdot (7000)\left(\frac{1}{43560}\right) = 203$ a-f

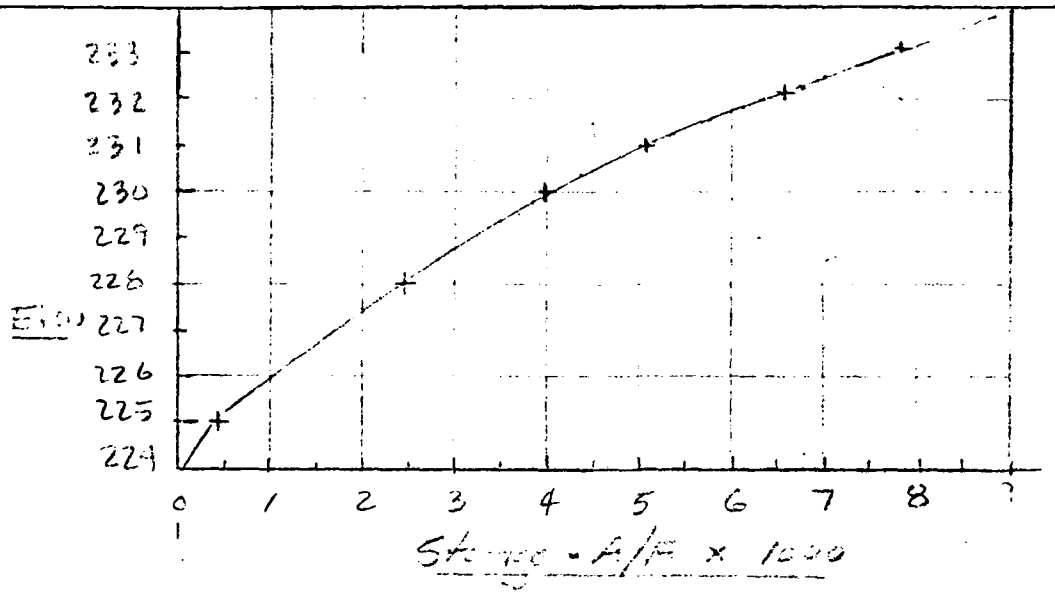
$Q_{P_2} = 2880\left(1 - \frac{203}{5200}\right) = 2765$ cfs

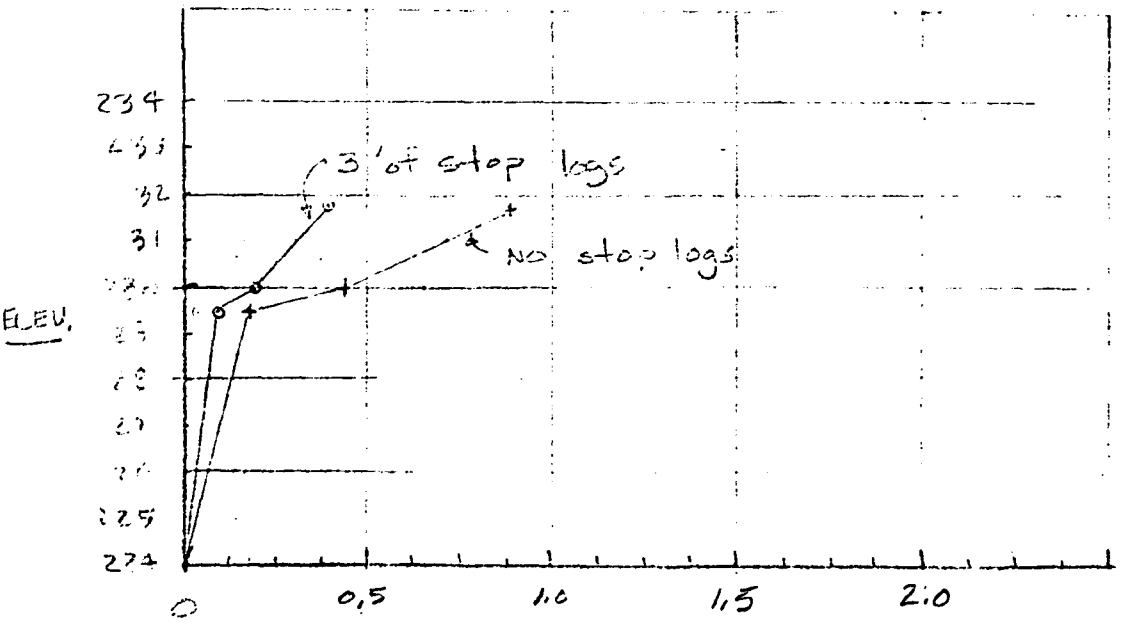
$EI_2 = 216.5$ $A_2 = 1100$ $S_2 = \frac{1165 \cdot (7000)}{43560} = 187$.

$Q_{P_3} = 2880\left(1 - \frac{187}{5200}\right) = 2774$ cfs

HH&B HAYDEN, HARDING & BUCHANAN, INC.
CONSULTING ENGINEERS
BOSTON, MASSACHUSETTS

JOB Davis
SUBJECT Conceptual
CLIENT CoE





– Culvert at Roadway –
one outlet, tailwater condition

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY | MO | YR
MA	71	NED	MA	013	01				CONGAMOND LAKES OUTLET (MIDDLE POND)	4201.3	7246.2	23FEB79

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
	CONGAMOND LAKES(MIDDLE POND)

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	08	GREAT BROOK	SOUTHWICK	2	6330

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	(27) IMPOUNDING CAPACITIES NORMAL (ACRE–FT.)
RE TPG	1900	R	9	7	5105	1350

DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
NED	N	N	N	N	07MAR79

(28) REMARKS

(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) SPILLWAY TYPE	(32) SPILLWAY WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) POWER CAPACITY PROPOSED (MW)	(37) NAVIGATION LOCKS NO.	(38) LENGTH (FT.)	(39) WIDTH (FT.)	(40) LENGTH (FT.)	(41) WIDTH (FT.)	(42) LENGTH (FT.)	(43) WIDTH (FT.)	(44) LENGTH (FT.)	(45) WIDTH (FT.)
Y	120	C	16	680												

(46) OWNER	(47) ENGINEERING BY	(48) CONSTRUCTION BY
TOWN OF SOUTHWICK BOARD	1955-CHARLES T MAIN	

(49) REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

(50) INSPECTION BY	(51) INSPECTION DATE DAY | MO | YR	(52) AUTHORITY FOR INSPECTION
HAYDEN HARDING + BUCHANAN, INC	05DEC78	PUBLIC LAW 92-367

(53) REMARKS